B' cnc'd.

-- 22. (New) A piezoelectric ultrasound transmitter according to claim 14, 15, 18 or 19, wherein said component is built in the SMD manner. --

REMARKS

Applicants have considered the outstanding official action. It is respectfully submitted that the claims are directed to patentable subject matter and are in condition for allowance as set forth below.

Applicants note that claims 1-4 and 7-12 have been canceled and rewritten as new claims 13-22. This is to address the Examiner's objection to the numbering of certain claims. New claims 13-22 correspond to canceled claims 1-4 and 7-12 as follows:

New Claims	Prior Claims
13	1
14	3
15	4
16	10
17	2
18	11
19	12
20	7
21	8
22	9

New claims 13-22 are identical to the corresponding canceled claims 1-4 and 7-12, except that claims 13-22 are directed to a piezoelectric <u>ultrasound</u> transmitter. Support for the claimed piezoelectric ultrasound transmitter is found in the specification at page 1, lines 1-3.

Claims 1-4 and 7-12 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite. Specifically, the Examiner states that the claims define two separate elements, namely a piezo resonator and a capacitor, but that the original disclosure does not describe a separate capacitor. Applicants respectfully submit the claimed capacitor is not a separate element but rather is formed by the arrangement of the claimed first electrode on a first surface of a substrate made of piezoelectric material and the claimed second electrode on a second surface opposite the first surface. This arrangement is described in the specification at page 2, second paragraph and at page 3, sixth paragraph describing Figure 2. The circuit diagram of the piezoelectric ultrasound transmitter according to the present invention is shown in Figures 4a and 4b. Accordingly, the claims are submitted to be definite and adequately supported by the specification. Withdrawal of the §112 rejection is respectfully requested.

Claims 1-4 and 7-12 are rejected under 35 U.S.C. §103(a) as being unpatentable over Persson (U.S. Patent No.

3,818,254) or Sekler et al (U.S. Patent No. 4,561,286) in view of Ice (U.S. Patent No. 3,349,348) or Brenig (U.S. Patent No. 3,322,981) and combined with O'Brien et al (U.S. Patent No. 5,872,506). Withdrawal of the rejection is respectfully requested.

Before analyzing the prior art in detail, it is first noted that none of the prior art relied upon teaches every element of the claimed invention and, accordingly, there is no anticipation within the meaning of 35 U.S.C. §102. Realizing this, the Examiner relies on 35 U.S.C. §103. This means, therefore, that since none of the references teach all of the elements of the claims, it is necessary that there be some basis in the references which would cause one skilled in the art to combine the particular teachings to come up with the claimed invention. In the present instance, it is submitted that there is simply nothing in the prior art which would lead one skilled in the art to conclude that a piezoelectric ultrasound transmitter useful for measuring the temperature at the acoustic measuring point and transmitting the temperature data over a two pole supply lead could be obtained as in the present invention. As the court noted, In re Rinehart, 189 USPQ 143 (CCPA 1976),

> "A determination under 35 U.S.C. §103, however, requires consideration of the entirety of the disclosure made by the two references to those skilled in the art." (at 146)

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"The view that success would have been `inherent' cannot, in this case, substitute for a showing of reasonable expectation of success. Inherency and obviousness are entirely different concepts." (at 148, emphasis added)

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"The board held the view that Munro's teaching of higher pressures to increase reaction rate would have provided an obvious solution to the problem Rinehart encountered in scaling up the process of Pengilly. But Rinehart's problem was not the need for increased reaction rate. ... That problem is nowhere alluded to in either Pengilly or Munro, and of course no suggestion of a solution appears in either reference." (at 149, emphasis added).

This position by the Court of Customs and Patent Appeals has been adopted by the Federal circuit and emphasized in cases such as In re Wright, 6 USPQ2d 1959 (Fed. Cir. 1988) where the Court held that whether a novel structure is or is not obvious requires cognizance of the properties of that structure and the problem which it solves viewed in light of the teachings of the prior art. See, also, Diversitech Corporation vs. Century Steps, Inc., 7 USPQ2d 1315, 1318 Fed. Cir. 1988), where the law set forth in In re Wright and In re Rinehart, and similar cases, was acknowledged. Thus, in making a determination of obviousness, it is essential to consider the problem facing the inventor.

Here, the problem facing the inventor was how to provide a piezoelectric ultrasound transmitter that permits determining the temperature thereof at the acoustic measuring point in a simple manner. Thus, the claimed

invention teaches a piezoelectric ultrasound transmitter including a substrate made of piezoelectric material. A first electrode is provided on a first surface of the substrate and a second electrode on a second surface of the substrate opposite the first surface, the first electrode and second electrode in combination with the substrate forming a capacitor.

The first surface has an electrode-free rim surface on which is disposed a component having temperature-dependent behavior and a low impedance in comparison to the substrate. The capacitor is conductively connected, either in series or parallel to the component such that temperature data from the component are transmitted over a two-pole supply lead that is used to supply the first electrode and the second electrode. The claimed piezoelectric ultrasound transmitter therefore permits uncomplicated temperature determination directly at the acoustic measuring point of the transmitter since no additional leads for the component are needed. This way, the piezoelectric constant of the piezoceramic ultrasound transmitter can be determined. Page 2, second paragraph.

Contrary to the claimed invention, the references cited by the Examiner are not directed to piezoelectric ultrasound transmitters and thus do not address the problems specified above which are associated with piezoelectric

ultrasound transmitters. Persson, for example, is directed to a thermally compensated crystal 5 having a first electrode 15 on a front side and a second electrode 14 on the back side of the surface of the crystal 5. A resistive sensor 12 is placed on the front side of the crystal interconnecting the second electrode 15 with a third electrode 16 and is established in parallel with the resistive heater 11. The apparatus has three terminals 21-23. Terminals 21 and 22 are connected to two of the electrodes 14 and 15, respectively, providing a crystal signal circuit. Terminals 22 and 23 provide a resistive heater circuit, wherein terminal 22 is not common to the crystal signal circuit and the resistive heater circuit (Column 3, lines 29-40). Thus, Persson teaches the requirements of three terminals to fulfill the function of the piezoelectric crystal and the temperature sensing.

Sekler et al, on the other hand, teaches a piezoelectric contamination detector for determination of the mass or film thickness of gaseous, liquid or solid substances being absorbed or condensed on the surface of a piezoelectric resonator. The detector includes a measuring crystal 1 with electrodes 15 on both sides of the referenced crystal and an integrated temperature sensor 16 on one side (see Figures 1 and 2).

As stated by the Examiner, Persson and Sekler et al fail to teach the claimed component in series or parallel with the piezo element. Further, Persson and Sekler et al fail to teach or suggest transmitting temperature data from a component having temperature-dependent behavior and a low impedance in comparison to a substrate on which the component is disposed over a two-pole supply lead which is used to supply a first electrode and a second electrode. Thus, Persson and Sekler fail to teach or suggest any solution to the problem solved by the claimed invention.

The Examiner relies on Ice or Brenig in combination with O'Brien et al to make up for the shortcomings of Persson or Sekler et al. As with Persson and Sekler et al, none of Ice, Brenig or O'Brien et al is directed to a piezoelectric ultrasound transmitter. As such, none of the references teach or suggest the claimed invention or address the problem faced by the present inventors in developing the claimed piezoelectric ultrasound transmitter.

Ice teaches a temperature-compensated circuit arrangement for the temperature stabilization of the insertion loss of quartz crystal filters. Thus Ice is directed to crystal filters not piezoelectric ultrasound transmitters as claimed. Further, the temperature-compensated circuit arrangement of Ice includes a

resistance-temperature characteristic substantially complementary to that of the quartz crystal filter in order to compensate for temperature effects. Ice does not teach or suggest the claimed piezoelectric ultrasound transmitter for measuring the temperature at the measuring point as claimed.

Similarly, Brenig teaches a crystal temperature compensation network for a temperature sensitive electromechanical resonator. Therefore, Brenig, not unlike Ice, teaches compensating the temperature dependence of the frequency of a crystal. Thus, Brenig teaches using the compensating network to counteract the effects of temperature on the crystal but does so without measuring the temperature at the measuring point next to the resonator independent from the signal transmission of the resonator as in applicants' invention.

O'Brien et al teaches a piezoelectric transducer having directly mounted thereon electrical components for improving noise-making devices. The electrical components include an amplifier circuit which one skilled in the art knows influences the signal transmission to the piezoelectric transducer. Thus, one skilled in the art of transducers would not use the teachings of O'Brien et al to provide a piezoelectric ultrasound transmitter capable of measuring temperature at the acoustic measuring point and

transmitting the temperature data over a two pole supply lead for ascertaining the constant of the piezoelectric ultrasound transmitter. Further, in contrast to O'Brien, the claimed component has a temperature-dependent behavior and does not influence the signal transmission to or from the piezoelectric ultrasonic transmitter in spite of the usage of only one two-pole supply lead used to supply the first electrode and the second electrode.

In short, the applied references, alone or in combination, fail to teach or suggest the claimed component having a temperature-dependent behavior and a low impedance in comparison to a substrate made of a piezoelectric material on which the component is disposed, wherein a capacitor is conductively connected in series or in parallel to the component such that the temperature data from the component is transmitted over a two-pole supply lead that is used to supply a first electrode and a second electrode. The cited references do not give any hint to such an arrangement which includes the advantage that one two-pole supply lead is sufficient to provide for signal transmission from or to the piezoelectric ultrasonic transmitter for the temperature data. Furthermore, the cited references do not teach or suggest an improved piezoelectric ultrasound transmitter useful for measuring the temperature at the

acoustic measuring point. Accordingly, withdrawal of the §103 rejection is respectfully requested.

Reconsideration and allowance of the claims is urged.

Respectfully submitted,

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